PATENT COOPERATION TREATY

TRANSLATION

From the
INTERNATIONAL SEARCHING AUTHORITY

To:

PCT

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

(PCT Rule 43*bis*.1)

Date of mailing *(day/month/year)*	See form PCT/ISA/210
Applicant's or agent's file reference: 664-609 PCT	FOR FURTHER ACTION: See paragraph 2 below

International application No.	International filing date *(day/month/year)*	Priority date *(day/month/year)*
PCT/EP2005/000889	29.01.2005	30.01.2004

International Patent Classification (IPC) or both national classification and IPC
H01 L31/052, H01 L31/0216, F24J2/06

Applicant
SCHULZ, Detlef

1. This opinion contains indications relating to the following items:

- ☒ Box No. I — Basis of the opinion
- ☐ Box No. II — Priority
- ☐ Box No. III — Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV — Lack of unity of invention
- ☒ Box No. V — Reasoned statement under Rule 43*bis*.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI — Certain documents cited
- ☒ Box No. VII — Certain defects in the international application
- ☒ Box No. VIII — Certain observations on the international application

2. **FURTHER ACTION**

If a demand for international preliminary examination is made, this opinion will be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1*bis*(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

Name and mailing address of the ISA/EP	Authorized officer
Facsimile No.	Telephone No.

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Box No. I Basis of this opinion

1. With regard to the **language**, this opinion has been established on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.

   ☐ This opinion has been established on the basis of a translation from the original language into the following language _____, which is the language of a translation furnished for the purposes of international search (under Rule 12.3 and 23.1(b)).

2. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:

   a. type of material

      ☐ a sequence listing

      ☐ table(s) related to the sequence listing

   b. format of material

      ☐ in written format

      ☐ in computer readable form

   c. time of filing/furnishing

      ☐ contained in the international application as filed.

      ☐ filed together with the international application in computer readable form.

      ☐ furnished subsequently to this Authority for the purposes of search.

3. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table(s) relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.

4. Additional comments:

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Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims	1-11	YES
	Claims		NO
Inventive step (IS)	Claims	3, 4, 6, 8, 10, 11	YES
	Claims	1, 2, 5, 7, 9	NO
Industrial applicability (IA)	Claims	1-11	YES
	Claims		NO

2. Citations and explanations:

1.) This report makes reference to the following document:

D1: EP 0 019 016 A (MICHAEL, SIMON, DIPL-ING) 26 November 1980

D2: WO 97/01778 A (MINNESOTA MINING AND MANUFACTURING COMPANY) 16 January 1997

2.) **INDEPENDENT CLAIM 1**

The present application does not meet the requirements of PCT Article 33(1) because the subject matter of claim 1 does not involve an inventive step (PCT Article 33(3)).

Document D1 discloses a method for converting solar radiation energy into electric current and heat using colour-selective interference mirrors, which split the solar radiation into different wavelength ranges and concentrate the radiation on a plurality of photovoltaic cells optimised for various colours of light, the light being separated using interference mirrors into at least

Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

two spectral wavelength ranges so that each mirror reflects a wavelength range and transmits part thereof (see D1, figures 4 and 5; page 5, line 20 - page 10, line 4; claim 1).

The subject matter of claim 1 thus differs from the known prior art in that the interference mirrors in claim 1 consist of movable interference mirror films.

Document D2 discloses that type of film (see D2, pages 1 and 2). The films in D2 have the same optical properties as the interference mirrors in document D1. A person skilled in the art would include this feature in the method described in D1, since the films are only one of several obvious possibilities from which a person skilled in the art would choose according to the circumstances in order to solve the problem of interest, without thereby being inventive.

The feature whereby the interference mirrors in claim 1 of the present application are movable is considered to be implicitly disclosed in document D1. In fact, in a system and method such as shown in figures 1 to 5 of D1, it is inconceivable that the interference mirrors would not be adjustable, at least during mounting, in order to find the optimum position for concentrating and absorbing the radiation.

Such adjustment must mean that the mirror is

Box No. V — Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

movable and therefore this feature is also known, at least implicitly, from D1.

Claim 1 is therefore not considered inventive.

3.) The present application does not meet the requirements of PCT Article 33(1) because the subject matter of claim 5 does not involve an inventive step (PCT Article 33(3)).

Document D1 discloses a concentrator-solar collector device, with colour-selective mirrors, lenses being disposed in a frame of the solar collector and a photocell being provided in the optical focal point of the lenses, with an interference mirror being arranged between the lenses and the photocell (see D1, figures 4 and 5; page 5, line 20 - page 10, line 4; claim 1).

The subject matter of claim 5 is also not considered inventive for the same reasons as specified in relation to claim 1.

4.) The subject matter of dependent claims 2, 7 and 9 of the present application also fails to involve an inventive step (PCT Article 33(3)). The subject matter of claims 2, 7 and 9 is known from D1 (see D1, figures 4 and 5; page 5, line 20 - page 10, line 4; claim 1).

Those claims can therefore add nothing inventive to the subject matter of claims 1 and 5 (PCT

Box No. V — Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

Article 33(3)).

5.) The combinations of features contained in dependent claims 3 and 4, and 6, 8, 10 and 11 are neither disclosed nor suggested by the available prior art.

A combination of the subject matter of claim 1 with the features of claims 3 and 4, or of the subject matter of claim 5 with the features of claims 6, 8, 10 and 11, would therefore meet the requirements of PCT Article 33(2) and (3).

6.) The subject matter of claims 1-11 meets the requirements of PCT Article 33(4), since it is industrially applicable.

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Box No. VII **Certain defects in the international application**

The following defects in the form or contents of the international application have been noted:

Contrary to PCT Rule 5.1(a)(ii), the description does not cite documents D1 and D2 or indicate the relevant prior art disclosed therein.

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Box No. VIII **Certain observations on the international application**

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

1.) The subject matter of claims 1, 3, 5, 8 and 11 does not meet the requirements of PCT Article 6.

1.1) The subject matter of claim 1 is unclear (PCT Article 6).

It is not clear from the claim how the light is concentrated on the solar cell, since no concentration system is disclosed. The word "movable" is vague. It is not clear how and when the movement takes place and whether it is continuous or not. For example, an adjustment movement could be meant, although that is not supported by the description. It is also not clear how the energy is converted into heat.

1.2) Dependent claim 3 claims spindles, although no such spindles have been previously defined. It is therefore also unclear what is meant by "axial offset of the spindles".

1.3) The subject matter of independent claim 5 is unclear. The form and geometry of the concentrator-solar collector is not clear. It is also not clear what the device should do. The effect of the interference mirror films is not specified and it appears as if a single solar cell is needed, which would appear to contradict the nature of the invention, since in that case only

Box No. VIII Certain observations on the international application

one wavelength would be used for the energy conversion.

1.4) The subject matter of claim 8 is not clear. Firstly, it appears inconsistent with the subject matter of claim 5, on which it is dependent. In claim 8, one end of an optical waveguide is arranged in the region of the optical focal points of the lenses. In claim 5, however, photocells are disposed at those focal points. Secondly, it is not clear for what the optical waveguide is used.

1.5) The subject matter of claim 11 is not clear, since the effect of the semiconductor layer system with narrow energy gaps and the constitution of the layer system as a whole are not clear.